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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,050	08/17/2001	Yoshinori Atsumi	09792909-5142	4510

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SONNENSCHN NATH & ROSENTHAL LLP
P.O. BOX 061080
WACKER DRIVE STATION, SEARS TOWER
CHICAGO, IL 60606-1080

EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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06/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/932,050	ATSUMI ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,14-19 and 22-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,14-19 and 22-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 4/10/07. Applicant's arguments have been considered, but are not persuasive. Claims 1, 4, 14-19 and 22-32 are pending. This Action is FINAL, as necessitated by amendment.

Specification

The disclosure is objected to because of the following informalities: paragraph 27 was amended in the communication of 4/10/07. The amended added previously deleted material from the original specification. Therefore, the previous objection to the specification is reinstated. The specification contains the formula $D_sE_tLi_u$, which is indefinite because "E" is not defined by the specification as filed. Appropriate correction is required.

The amendment filed 4/10/07 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the alloy or compound " Ni_2Si " is not supported.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 14-19 and 22-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the

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relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 4 recite “a conductive agent comprising $D_sE_tLi_u$, wherein D is tin or silicon, E includes another element, Li is lithium, and $s > 0$, $t > 0$, and $u > 0$ ”, which is not supported by the specification as filed. “E includes another element” is not supported by the specification as filed. The specification as filed does not define “E”. Claims 29 and 32 recite “E is selected from elements and compounds consisting of ... Mg_2Si , Ni_2Si ” or “E includes Mg_2Si , Ni_2Si ”, respectively, which are not supported by the specification as filed. The specification teaches silicon is represented by “D”, not “E”, in the conductive agent formula. The compound Ni_2Si is not supported by the specification. Furthermore, the groups should be closed by an “and” or “or” to recite proper group language.

Claims 1, 4, 14-19 and 22-32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the conductive agents disclosed in paragraph 28, page 7, does not reasonably provide enablement for any other conductive agent. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Specifically, if tin is chosen as “D”, the specification does not enable an element for “E”. Furthermore, if silicon is chosen as “D”, only the specific examples for “E” disclosed in the specification (paragraph 28) may be claimed. There is no broad disclosure/definition for “E” in the specification as filed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 22 recites “and mixtures thereof”, which should be deleted because “mixtures” does not read on the conductive agent formula of claim 22.

To the extent the claims are understood in view of the 35 U.S.C. 112 rejections above, note the following prior art rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 4, 14-19 and 22-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Inamasu, JP 10-312789.

Inamasu teaches a nonaqueous electrolyte secondary battery comprising an active material phosphoric acid compound of the formula Li_xFePO_4 (x depends of the valence of Fe) for the positive or negative electrode active material (0007,0011). Note iron has two possible valence states, 2+ or 3+, and phosphate has a 3- charge. Therefore, $0 \leq x \leq 1$. The Li_xFePO_4 active material has an average grain size (particle diameter) of 0.1-100 μm (0020). Examiner points out that Li_xFePO_4 is a preferred compound disclosed by the present specification on page 5. It is important to use a small active material to improve cycle characteristics of the battery

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(0007). When the phosphoric acid compound is used as the positive active material, the negative active material may be a carbon material such as graphite, lithium or a lithium alloy. Graphite intercalates (dopes) lithium (0018). Lithium metal, lithium alloy and carbon material are all typical materials used for the negative electrode active material of the nonaqueous secondary battery (0002-0004). The electrode materials may be sintered (0023). The nonaqueous electrolyte may include an electrolyte solution comprising an organic solvent (e.g., propylene carbonate) and an electrolyte salt (e.g., LiClO_4) (0012).

The electrodes may include conductive agents, binders or fillers (0013). The electrodes are configured into a film-like structure (molded body) (0009). The negative electrode may include silicon or germanium (0018). Thus the claims are anticipated.

*

Claims 4, 19, 22-26 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamauchi et al., US 5,705,296.

Kamauchi teaches a lithium secondary battery comprising a positive electrode, a negative electrode and an electrolyte wherein the positive electrode is composed of a lithium-cobalt phosphate positive active material. The lithium-cobalt phosphate is preferably LiCoPO_4 (col. 4, lines 16-19) and the active material may comprise only LiCoPO_4 (col. 4, lines 32-34). Transition metals besides cobalt such as Ni, Fe, Mn, Cr and V may be contained in the lithium-phosphate positive active material (col. 4, lines 42-44). The negative electrode may be a carbon material doped with lithium ion (col. 6, lines 15-23). The electrolyte comprises an electrolytic salt and a nonaqueous solvent (col. 7; lines 45-60). The positive electrode may comprise at least the lithium-transition metal phosphate active material, an electrical conducting agent and a binder

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(col. 4, lines 61-65). The mixture is blended and formed into a positive electrode having desirable shape and size by a known method such as compression molding (col. 5, lines 18-22). The carbon active material of the negative electrode is mixed with a binder and formed into a carbon negative electrode of a desirable shape and size by compression molding (col. 7, lines 40-44). The positive active material has an average particle size of 0.01-20 μm (col. 2, lines 47-66). The carbon material of the negative electrode may be graphite (col. 7, lines 38-39). The electrolyte solution includes a solvent and a salt. The salt may be LiClO_4 and the solvent may be propylene carbonate (col. 7, lines 45-60). The negative electrode may contain a metal alloyed with lithium. The metal may be boron, aluminum, silver, zinc or tin (6:44-50).

Thus the claims are anticipated.

Response to Arguments

Applicant's arguments filed 4/10/07 have been fully considered but they are not persuasive.

Applicant asserts those of ordinary skill in the art would understand that "E" means "any element". Examiner disagrees. Furthermore, the assertion is not supported. Applicant argues "E is not always a necessary component of the anode material because "t" may have a value of zero". This argument is not commensurate in scope with the claimed invention because "t" must have a value greater than zero. Applicant points to paragraph 27 of the specification, however, this paragraph does not define "E".

Applicant argues Inamasu fails to teach a cathode composed of $\text{Li}_x\text{Fe}_y\text{PO}_4$ having an olivine structure and having a particle diameter not greater than 1 micrometer and wherein $0 < x \leq 2$ and $1 < y \leq 2$, and an anode comprising a conductive agent have the formula $\text{D}_s\text{E}_t\text{Li}_u$,

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wherein D is tin or silicon. However, Inamasu teaches a nonaqueous electrolyte secondary battery comprising an active material phosphoric acid compound of the formula Li_xFePO_4 (x depends of the valence of Fe) for the positive or negative electrode active material (0007,0011). Note iron has two possible valence states, 2+ or 3+, and phosphate has a 3- charge. Therefore, $0 < x \leq 1$. The Li_xFePO_4 active material has an average grain size (particle diameter) of 0.1-100 μm (0020). Examiner points out that Li_xFePO_4 is a preferred compound disclosed by the present specification on page 5. It is important to use a small active material to improve cycle characteristics of the battery (0007). Applicant's argument that the particle size refers to the negative electrode material is not persuasive. Inamasu uses the phrase "forward negative electrode" which refers to the positive electrode (forward negative electrode) of the battery (0010). As is well known in the battery art, the designation of "positive" or "negative" electrode depends on whether the battery is charging or discharging. Reduction occurs at the cathode. Furthermore, Inamasu teaches the electrodes may include conductive agents, binders or fillers (0013). The electrodes are configured into a film-like structure (molded body) (0009). The negative electrode may include silicon (0018).

Applicant argue Inamasu lacks a specific example falling within the particle diameter range of the claimed invention. However, the endpoint of 0.1 micrometers of the prior art falls within the claimed range. Furthermore, Inamasu teaches it is important to use a small active material to improve cycle characteristics of the battery (0007). Applicant asserts unexpected results are provided. However, the Applicant does not compare the prior art of record with the claimed invention. Unexpected results must distinguish the claimed cell over the cell of the prior art in order to be persuasive.

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Applicant argues Kamauchi fails to teach an anode comprising a conductive agent having the formula $D_sE_tLi_u$, wherein D is tin or silicon. However, Kamauchi teaches the negative electrode may contain a metal alloyed with lithium. The metal may be boron, aluminum, silver, zinc or tin (6:44-50). Applicant argues Kamauchi fails to disclose an anode comprising a sintered carbon material. However, this argument is not commensurate in scope with the claimed invention.

Applicant argues Kamauchi does not disclose a cathode comprising $Li_xFe_yPO_4$ having a particle diameter not greater than 1. However, Kamauchi teaches transition metals besides cobalt such as Ni, Fe, Mn, Cr and V may be contained in the lithium-phosphate positive active material (col. 4, lines 42-44) and the positive active material has an average particle size of 0.01-20 μm (col. 2, lines 47-66). Kamauchi is not limited to any particular example disclosed by the reference. Applicant's argument regarding the grain size of the negative active material is not commensurate in scope with the claimed invention. Again, Applicant asserts unexpected results are provided. However, the Applicant does not compare the prior art of record with the claimed invention. Unexpected results must distinguish the claimed cell over the cell of the prior art in order to be persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 13, 2007


TRACY DOVE
PRIMARY EXAMINER